

RatingsDirect®

Massachusetts; Appropriations; CP; General Obligation; General Obligation Equivalent Security; Joint Criteria; Sales Tax

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Credit Profile

US\$250.0 mil GO bnds consolidated loan ser 2018D due 05/01/2048		
<i>Long Term Rating</i>	AA/Stable	New
US\$250.0 mil GO bnds consolidated loan ser 2018C due 05/01/2034		
<i>Long Term Rating</i>	AA/Stable	New
US\$210.0 mil GO rfdg bnds ser 2018B due 07/01/2027		
<i>Long Term Rating</i>	AA/Stable	New
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed

Rationale

S&P Global Ratings has assigned its 'AA' rating to the Commonwealth of Massachusetts' \$210 million general obligation (GO) refunding bonds 2018 series B, \$250 million GO bonds consolidated loan of 2018 series C, and \$250 million GO bonds consolidated loan of 2018 series D.

In addition, S&P Global Ratings has affirmed its 'AA' rating on approximately \$23 billion of parity GO bonds outstanding, and its 'A' rating on Boston Housing Authority housing project bonds, West Broadway Homes IV project, series 2003, supported by the commonwealth. The outlook on all ratings is stable. Finally, S&P Global Ratings has affirmed its 'A-1+' short-term rating on the state's GO-secured commercial paper.

The Boston Housing Authority bond rating is now based on the application of our "Issue Credit Ratings Linked To U.S. Public Finance Obligor's Creditworthiness" criteria (published Jan. 22, 2018, on RatingsDirect). The bonds are payable from loan repayments made by West Broadway Redevelopment L.P., the owners of the project, with an additional security interest in all money on deposit in a state-operated subsidy fund held in the custody of a depository, subject to the terms of a trust agreement. Revenue that flows into the state-operating subsidy fund result from an amended contract for financial assistance between the commonwealth, acting through its department of housing and community development and the Boston Housing Authority. We rate this obligation three notches lower than our rating on the commonwealth based on our view of Massachusetts' general creditworthiness to reflect the appropriation risk associated with the annual payment. We view these bonds as having a weak involvement by Massachusetts as obligor for projects that are not fundamental to the commonwealth's operation, a moderate risk as to payment source, and a moderate political, timing, or administrative risk related to the debt payment.

Factors supporting the 'AA' GO rating include what we view as Massachusetts':

- Deep and diverse economy, which continues to outperform the nation on several economic indicators;

- High income levels, with per capita income at 131% of the nation in 2017;
- Timely monitoring of revenues and expenditures and swift action when needed to make adjustments;
- Strong financial, debt, and budget management policies, including annualized formal debt affordability statements, and multiyear capital investment planning; and
- Modest budget stabilization fund (BSF) balance, equal to 3.2% of expenditures at fiscal year-end 2017.

Offsetting factors include high debt, pension, and other postemployment benefit (OPEB) liabilities. In particular, the commonwealth has a low 59.5% combined pension-funded ratio and has contributed less to its pension funds than the actuarial annual required contribution (ARC) in every fiscal year since 2011; however, Massachusetts has put in place a plan to increase annual pension contributions 8.9% per year in order to fully amortize unfunded pension liabilities by 2036, and the \$898 million shortfall against ARC in fiscal 2018 is only about 2.1% of projected expenditures. The state has budgeted to pay 73% of the ARC in fiscal 2018, about the same level as the 72% paid in fiscal 2017.

We understand consolidated loan 2018 series B bond proceeds will be used to refund previously issued debt, while 2018 series C and D bonds will fund various capital projects included in the commonwealth's five-year capital improvement plan.

Massachusetts' economy has grown steadily in recent years, outpacing national and regional trends by most measures. State personal income rose 3.3% in 2017, rising to 131% of that of the nation (second only to Connecticut) from 130% the year before. The commonwealth's average annual unemployment rate in 2017 was 3.7% compared with 4.4% for the nation. Massachusetts has an above-average hi-tech employment sector, estimated by IHS Markit at about 10% of state employment, compared to 6.5% for the country as a whole. Following the financial crisis, employment growth was strong relative to that of other states and the commonwealth regained its pre-recession employment peak in 2013, according to the Bureau of Labor Statistics. However, IHS Markit forecasts slightly lower state employment growth in 2018, 2019, and 2020 at 1.2%, 1.5%, and 1.1%, respectively, in those years, compared to its forecast of 1.6%, 1.9%, and 1.3% for the U.S. in those years, respectively. In our view, Massachusetts' economic fundamentals and key anchors, which center on higher education, technology, finance, and health care, should contribute to continued expansion.

Despite a prolonged period of economic expansion and generally positive revenue trends, Massachusetts continues to operate with thin operating margins and has needed to make midyear budget adjustments over each of the past three years to address a combination of revenue shortfalls and spending pressures. In fiscal 2017, the state made a midyear spending adjustment to close identified revenue shortfalls; actual tax revenues in fiscal 2017 came in at 95.5% of budgeted revenues. The commonwealth ended fiscal 2017 with a BSF balance of \$1.3 billion, or an adequate 3.1% of operating expenditures and other uses, almost unchanged from the year before.

In January, Massachusetts made a minor midyear upward revision to its projected fiscal 2018 tax revenue estimate of \$157 million (0.4% of expenditures), although it might be a while before the effect of taxpayer acceleration of income to calendar 2017--as a result of federal tax reform--can be fully evaluated. We believe recent federal tax reform that reduces federal income tax deductibility for state property and income tax could also have a negative economic effect in the future on high tax states such as Massachusetts (see "U.S. Tax Reform: Legislation Lays Groundwork For Reshaping the Federal-State Fiscal Relationship," published Dec. 4, 2017, on RatingsDirect).

We view fiscal 2018 as essentially structurally balanced, except for the underfunding of pension actuarially determined contribution (ADC), which represents about 2.1% of expenditures and other uses. The commonwealth is currently projecting a fiscal year-end 2018 BSF balance of \$1.4 billion, or what we view as a modest 3.2% of expenditures and other uses. Massachusetts projects total fiscal 2018 operating fund balances including the BSF, the undesignated balance, and reserved or designated balances at essentially the same amount as the BSF balance alone. The commonwealth's fiscal 2019 consensus tax revenue forecast shows 3.5% growth, while the governor's executive budget proposal for fiscal 2019 anticipates expenditure growth of 2.6%, excluding \$452 million in transfers to a Medical Assistance Trust, and we view it as essentially structurally balanced, except for continued underfunding of pension ADC.

The governor's fiscal 2019 executive budget includes a modest \$96 million deposit to the BSF, although enacted budgets in recent years have overridden statutory procedure for transferring certain excess capital gains tax into the BSF in order to use it for operating spending. Massachusetts is projecting capital gains taxes at about its threshold for determining excess capital gains in fiscal 2018, and projects a small \$66 million BSF deposit in fiscal 2018.

Other budgetary pressures for fiscal 2018 and beyond include MassHealth expenses that are rising at a faster rate than revenues and that have been one of main sources of previous midyear budget adjustments. This pressure has been mitigated in part by greater scrutiny of Medicaid eligibility, which has caused Medicaid enrollment member months to decline slightly in fiscal 2018, particularly as adults are moved to the state insurance health care Connector. Additional long-term stresses include a state pension payment schedule that increases annual pension contributions by 8.9% annually, a pace we believe is likely to exceed revenue growth. Although we recognize that Massachusetts has made budgeting its fixed costs a priority, we also view the growth in these areas as placing increased pressure on the commonwealth's ability to maintain structural balance. We calculate that combined fiscal 2018 operating funds debt service and state pension contributions are projected to total \$4.8 billion, or 11.0% of expenditures, while fiscal 2017 OPEB state employee contributions were \$521 (not including a \$25 million OPEB trust fund contribution), for a total of \$5.3 billion, or 12.2% of fiscal 2018 operating expenditures and other uses. Medicaid is projected to cost an additional \$15.7 billion in fiscal 2018 (35.8%), while transfers to the commonwealth's Medical Assistance Trust Fund are projected to be \$747.1 million.

A citizen's initiative for a 4% income tax surcharge on individuals making more than \$1 million per year has qualified for the November 2018 ballot; the surcharge could raise more than \$1 billion per year. Although the initiative would target the revenue for specific purposes, it is unclear whether such restrictions would constitute impermissible budgeting restrictions on the legislature under the state constitution. This initiative is currently undergoing a court challenge. Another initiative to lower the sale tax rate to 5.00% from 6.25% has gathered enough signatures to be placed before the legislature. If the legislature took no action, the backers could gather additional signatures to place it on the November 2018 ballot. If passed, it could potentially reduce tax revenue by about \$1.2 billion per year. The governor's executive proposal assumes neither initiative passes, and does not make estimates of the potential revenue effect if they do.

On a generally accepted accounting principles (GAAP) basis, Massachusetts ended fiscal 2017 (the most recent audited year) with an available assigned and unassigned general fund balance of \$1.04 billion, plus a BSF balance of

\$2.34 billion. This led to a combined balance that we view as still good at 5.9% of general fund expenditures and transfers out, but down from 6.6% at fiscal year-end June 30, 2016, and 7.5% at fiscal year-end 2015.

By most measures, we believe Massachusetts' debt burden remains high compared with that of other states. At fiscal year-end 2017, we calculate GO debt of \$22.7 billion and total tax-supported debt of \$37.1 billion, producing total tax-backed debt per capita of \$5,411, and 8.2% of personal income. As of Feb. 28, 2018, the commonwealth had \$22.9 billion of GO debt outstanding. Planned debt issuance remains within the parameters of Massachusetts' debt affordability policy and bond cap. A capital and debt affordability committee includes seven voting and eight nonvoting members from the legislature and is charged with formally reviewing the capital improvement plan (CIP) and providing an estimate of debt authorization for each year to stay within certain debt parameters. Massachusetts' currently anticipates selling about \$2.3 billion of new capital debt in fiscal 2018, similar to issuance levels in each of the past two years. We calculate fiscal 2017 total tax-backed debt service at 7.2% of general governmental spending, a level we view as moderately high.

Other long-term liabilities are also large, in our opinion. We believe Massachusetts' share of the net pension liability for combined state pensions systems is high at \$37.3 billion as of the Jan. 1, 2017, valuation date on a Governmental Accounting Standards Board (GASB) 67/68 basis, or \$5,438 per capita, and 8.3% of personal income. The aggregate funded ratio improved slightly to 59.5% from 57.3% the year before on a GASB basis, but the three-year average declined to 59% from 62% in 2016. A decline in the commonwealth's actuarial pension-funded ratio as of the Jan. 1, 2016, actuarial valuation date was primarily due to Massachusetts' decision to lower assumed actuarial returns to a less aggressive 7.50% in 2016 from 7.75%, after previously lowering it to 7.75% from 8.00% in 2015. Massachusetts sets its annual pension contribution based on its own methodology under state statute; it has not fully funded its ARC since fiscal 2011, but currently plans to increase pension contributions 8.9% per year to fully amortize the unfunded liability by 2036.

In our opinion, Massachusetts' unfunded OPEB is also moderately high, at \$19.4 billion as of Jan. 1, 2017, net of \$817.4 million of actuarial assets in an OPEB trust fund, or \$2,834 per capita. Massachusetts has in recent years made payments to an OPEB trust fund, with the increase in unfunded OPEB from \$16.3 billion the year before; this is primarily attributable to use of a more conservative 3.6% actuarial discount rate. In 2018, the commonwealth has appropriated 10% of tobacco settlement revenue, equal to about \$25 million, into its OPEB trust fund.

Based on the analytic factors we evaluate for states, on a scale of '1.0' (strongest) to '4.0' (weakest), we have assigned a composite score of '1.9' to Massachusetts, which is consistent with a 'AA' indicative rating.

Outlook

The stable outlook reflects our view that Massachusetts' strong economic growth and proactive management that will allow the commonwealth to continue to manage its budgetary pressures, even amid potential midyear budget shortfalls, albeit with some continued use of one-time measures to balance the budget. At the current rating level, we expect the commonwealth to maintain relatively stable, although somewhat limited, reserves. We further expect it to take measures to manage the potential state financial impact of recent federal tax reform or Medicaid growth within

our two-year outlook horizon.

Upside scenario

Should the commonwealth demonstrate a renewed commitment to building its reserves during periods of economic growth, absent rising long-term liability funding pressures, we could raise the rating.

Downside scenario

The rating could see further downward pressure if Massachusetts fails to maintain near-structural balance during periods of economic expansion. Among the factors that could further pressure the rating are Medicaid costs outpacing revenue growth, reduced revenues in recessions due to income tax cyclicalities, above-average presence of high-tech sector employment, the economic impact of federal tax reform on high tax states, and growing state fixed costs in excess of revenue growth that might lead to significant structural imbalance and greatly diminished reserves. Structural balance could specifically be pressured to the extent that Massachusetts fails to adhere to its current plan to increase annual pension contributions by 8.9% per year to amortize unfunded pension liabilities.

Governmental Framework

State finance law requires that the governor submit a balanced budget and the House and Senate each produce a balanced budget. The final general appropriation act must also be balanced. If there is a revenue shortfall, the governor is required by section 9C of Chapter 29 to reduce agency appropriations or recommend a transfer from the BSF.

Massachusetts has autonomy to raise taxes and has adjusted its tax structure. Medicaid accounted for about 37% of total fiscal 2017 spending while direct local aid accounted for about 14%. Funding levels for major program areas have been adjusted as needed. Massachusetts voters have approved revenue growth limitations, but these have not negatively affected operations or limited flexibility, in our view. More significant measures to reduce or eliminate major tax sources have been on the ballot but not approved. A citizens' initiative to place a 4% income tax surcharge on incomes of more than \$1 million will be on the November 2018 ballot, if it survives legal challenges, which may or may not determine whether the additional revenue would be restricted, if approved. Another citizens' initiative could be on the same ballot, which would reduce the sales tax rate, depending on either legislative action or additional signature gathering.

The commonwealth is authorized to issue GO debt, special obligation debt, and federal grant anticipation notes. There is a statutory limit on debt outstanding and a limitation as stipulated by Massachusetts' debt affordability policy published annually with the commonwealth's CIP, which is designed to limit debt service on Massachusetts' direct debt to no more than 8% of budgeted revenues. These limitations have not impaired flexibility to manage capital and infrastructure requirements. There is no statutory priority for funding debt, but debt service payments are not subject to the warrant requirement applicable to other state spending, and we understand that the comptroller and other state officials have developed procedures to prioritize payments and that debt service is given the highest priority among various payment obligations.

On a scale from '1.0' (strongest) to '4.0' (weakest), S&P Global Ratings assigned a score of '1.5' to the commonwealth's governmental framework.

Financial Management

Financial management assessment: Strong

S&P Global Ratings maintains a strong financial management assessment (FMA) score for Massachusetts. In its framework, an FMA of strong indicates that practices are strong, well embedded, and likely sustainable. Many of the commonwealth's management practices related to debt and financial management are embedded in statute.

Highlights include the following:

- Massachusetts uses internal resources and outside economic forecasting firms to develop consensus revenue forecast. It has regularly performed monthly revenue estimates and quarterly budget reviews. Legislation approved in 2008 requires that revenue reports be submitted semi-monthly to the legislature.
- A five-year CIP (administrative intent, not binding) coordinates every facet of debt issuance. The CIP includes a detailed debt affordability analysis that officials update each year.

The commonwealth has detailed and frequently reviewed investment policies managed through the office of the treasurer. Quarterly cash flow projections are prepared and submitted to the legislature.

Massachusetts has a statutorily established BSF that prescribes a mechanism for funding, as well as funding levels; however, the mechanism has been weakened in the past few years by the decision to adjust deposit thresholds and suspend required transfers into the fund. Statute requires the deposit of 100% of consolidated net surplus in any given year into the BSF. The statute also provides that the BSF's maximum amount cannot exceed 15% of the current year's revenues. The commonwealth must use any excess for tax reduction. A change in 2010 directed capital gains tax revenues of more than \$1 billion to the fund, although Massachusetts has suspended this in the past two years. Legislation from 2012 indexes the capital gains amount to growth in U.S. GDP. The statute also directs 5% of the excess to the state retiree benefits trust fund and the pension liability fund. We believe this measure has the benefit of enhancing the fund while decreasing budget reliance on this cyclical revenue source. Nevertheless, in fiscal years 2015 and 2016, the commonwealth diverted to the general fund excess capital gains tax that would otherwise have gone to the BSF. A revised threshold and lower collections in fiscal 2017 eliminated the potential for a transfer in that fiscal year. Some judgments and settlements must also be deposited to the fund, although this requirement was modified in fiscal 2015 so that only settlements and judgments exceeding the average of the total for the preceding five fiscal years would be transferred to the BSF.

There are statutory limits on debt issuance. For direct debt, there is a limit allowing the issue of up to 105% of the previous year's limit. In addition to the aforementioned statutory requirement, the governor's office adheres to an administrative bond cap (debt service capped at 8% of budgeted revenues), which sets the annual limit on debt issuance. The treasurer's office maintains debt management and swap policies that we view as comprehensive. Officials also introduced an asset-liability management policy in fiscal 2014.

The commonwealth has detailed and frequently reviewed investment policies managed through the office of the treasurer. Quarterly cash flow projections are prepared and submitted to the legislature.

Budget Management Framework

Once the budget is approved, the Secretary of Administration and Finance (A&F) monitors expenditures, at least quarterly, and receives regular monthly updates on revenue receipts. The A&F secretary is required to formally update revenue projections and submit them to the legislature in October. If officials expect projected revenues to be insufficient to meet appropriations, A&F certifies this and, pursuant to statute (section 9C of Chapter 29), the governor is required to reduce allotments, or submit proposals to raise additional revenues or to make appropriations from the BSF to restore balance. Budget adjustments have historically been implemented regularly and on time, and deficits are not carried forward.

Massachusetts is a voter-initiative state. Although there have been initiatives that limit the overall growth in state tax revenue and a limit on the amount of bonds outstanding and debt service appropriations, these have not substantially altered Massachusetts' ability to manage its budget or fund debt service in our opinion. While more recent ballot initiatives to reduce or eliminate the commonwealth's major tax sources were not approved, the legislature can amend an initiative, and a recent initiative rolled back inflation indexing for a gas tax. An initiative to add an extra 4% income tax to annual income of more than \$1 million a year will be on the November 2018 ballot if it survives a court challenge regarding its ability to restrict use of revenue proceeds under the commonwealth's constitution. If it passes court muster and is approved by the voters in November 2018, the measure would become law effective in calendar 2019, with the fiscal impact occurring primarily in fiscal 2020.

There is also another initiative lowering the state sales tax rate to 5.00% from 6.25% that has gathered enough signatures to be placed before the legislature. If the legislature does not act, the backers could gather additional signatures to place it on the November 2018 ballot.

The commonwealth provides a relatively high level of service, in our opinion. Adjustments have been made to programs but reductions to areas such as education have been limited.

On a scale from '1.0' (strongest) to '4.0' (weakest), S&P Global Ratings assigned a score of '1.0' to Massachusetts' financial management framework.

Economy

Massachusetts' labor market fared relatively well in 2017. The average annual unemployment rate declined to a very low 3.7% in 2017, compared to a federal unemployment rate of 4.4%. The U.S. Census Bureau population estimate for Massachusetts in 2017 is 6.9 million, a 0.50% increase from 2016, and a 0.65% compound annual growth rate over the last 10 years, compared to 0.78% for the nation. Although it below that of the nation, population growth has outpaced the region since 2007 and we expect this trend to continue. The commonwealth's age dependency ratio of nonworking age population to working age population, at 56.3% in 2016, was better than that of the nation (61.3%).

Massachusetts has always had high income levels. Per capita personal income increased to \$65,890 in 2017, or 131% of the national level, up from 130% the year before and 127% in 2014. State per capita income ranks second highest

among all the states. We expect that income will remain well ahead of that of other states based on the nature of the jobs being created and the pace of expansion. IHS Markit forecasts real state gross product to rise 2.5% in 2018, 2.7% in 2019, and 2.1% in 2020, at rates slightly under, but comparable to, its forecast for the U.S. In 2016, gross state product per capita was 129% of that of the nation.

The economy has diversified and education and health services now make up the primary employment sectors, accounting for 22.0% of total nonfarm employment in 2017 according to the Bureau of Labor Statistics, compared to 15.8% for the nation. This is followed by trade and transport (16.0% versus 18.8% nationally) and professional business services (15.7% versus 13.9%). The manufacturing and construction sectors, known for their cyclicity, represent only 6.8% and 4.2% of employment, respectively. The increasing role of services in the economy reflects growth in research laboratories, computer software, management consulting, other business services, and health care. Higher education anchors, a high level of federal research funding, and venture capital give the commonwealth a leading edge in emerging industries, such as biotechnology, software, communications equipment, and surgical instruments. IHS Markit estimates 10% of state employment is in high-tech-related industries. In addition, Massachusetts' defense-related industries continue to perform well, and the commonwealth ranks high in the value of federal defense and research contract awards. However, it is unclear how recent federal tax reform, with its limitation on state and local tax deductions, might affect high tax states such as Massachusetts.

On a scale from '1.0' (strongest) to '4.0' (weakest), S&P Global Ratings assigned a score of '1.4' to Massachusetts' economy.

Budgetary Performance

The state has established a formal BSF under statutory law that receives excess capital gains taxes over a threshold amount, indexed for inflation. A threshold of \$1 billion was in effect for fiscal years 2011, 2012, and 2013. Since then, the threshold is subject to annual adjustment to reflect the average annual rate of growth in U.S. GDP over the preceding five years. Under statutory law, tax revenues collected from capital gains income during a fiscal year that exceed the threshold are required to be transferred to the BSF, with 5% of the amount so deposited then transferred to the State Retiree Benefits Trust Fund (for OPEB) and an additional 5% transferred to the commonwealth's pension liability fund. However, in fiscal years 2015 and 2016 state budgets diverted capital gains taxes that would have otherwise flowed to the BSF to instead pay for general fund budget expenditures. In 2017, capital gains taxes came in below the level that would have triggered a transfer of excess capital gains to the BSF. The commonwealth currently projecting a small \$66 million increase in the BSF in fiscal 2018 due to capital gains taxes being slightly over the threshold, as well as abandoned property and certain lottery revenues also required to be deposited in the BSF.

Massachusetts projects fiscal 2018 will have 4.3% growth in operating fund tax revenue, and 4.4% total operating revenue and other sources growth, to \$43.62 billion. After spending and other uses growth of 4.5%, to \$43.72 billion, it projects a slight operating deficit of \$95 million, or 0.2% of spending. In our view, fiscal 2018 is close to structural balance, apart from the underfunding of the pension ARC, still a modest 2% of total expenditures and other uses. However, even though Massachusetts is in the ninth year of economic recovery and experiencing positive revenue trends, and despite policies that were intended to more aggressively build up reserves to help the commonwealth

manage through revenue downturns, budget worries remain, in our view, regarding growth in MassHealth and pension spending and the lack of a build-up of the BSF during a period of positive revenue growth.

The BSF reached a peak of \$2.335 billion at fiscal year-end 2007, before being drawn down to \$670 million at fiscal year-end 2010 during the Great Recession. The commonwealth subsequently began using judgments and settlement and other surpluses to build up the fund again to \$1.65 billion at fiscal year-end 2012, before drawing it down to \$1.25 billion in 2014. The BSF balance stood at \$1.30 billion at fiscal year-end 2017, or 3.1% of operating expenditures. The commonwealth projects a \$66 million deposit to the BSF, which will depend in part on actual capital gains taxes collected during the year. Budgeted fiscal 2018 capital gains tax in total represents about 5% of fiscal 2018 operating tax revenues.

We view Massachusetts' liquidity as strong, with the help of annual cash flow note borrowing. The commonwealth does not engage in interfund borrowing. It currently projects to end fiscal 2018 with a general fund cash balance of \$2.5 billion, and estimates its month-end cash low point in fiscal 2018 will have been November 2017, with a \$1.9 billion non-segregated operating funds cash balance. Earlier in fiscal 2018, the commonwealth issued \$1.5 billion in revenue anticipation notes, maturing in April, May, and June 2018. Cash flow notes must be repaid by the end of the fiscal year. Fiscal 2017 ended with a non-segregated operating funds cash position of \$2.1 billion.

We view Massachusetts' revenue sources as diverse. Income tax was 57% of operating funds tax revenue in fiscal 2017 on a budgetary basis, and sales tax was 24%.

We believe the commonwealth's revenue forecasting is good. Massachusetts prepares quarterly revenue updates and uses a consensus revenue forecast for budgeting purposes. We believe that state budgeting has historically been done with an eye toward long-term structural balance, apart from below ARC pension contributions. However, we believe that Massachusetts is a high service state, with expenditures that could be difficult to reduce at times. In particular, Medicaid plus health and human services spending accounts for 50% of fiscal 2018 total projected expenditures, while operating funds' debt service accounted for about 5.5%. Pension funding costs from operating funds in fiscal 2018 are scheduled to increase 8.9% to \$2.4 billion, or another 5.5%, while OPEB costs for current retirees are about another 1.2%, not including a \$25 million transfer to the state's OPEB trust fund to pre-fund future liabilities.

On a scale from '1.0' (strongest) to '4.0' (weakest), S&P Global Ratings assigned a score of '2.0' to Massachusetts' budgetary performance.

Debt And Liabilities

We calculate total GO bonds outstanding at fiscal year-end 2017, the most recent audited year, at \$22.7 billion, and total tax-supported debt at \$37.1 billion, including debt issued by Massachusetts' authorities and supported by the statewide sales tax, gas taxes, and debt of state agencies supported by annual state contract assistance payments. The commonwealth reports it had \$22.9 billion of GO debt outstanding as of Feb. 28, 2018. By most measures, Massachusetts' debt burden remains high compared with that of other states. The variable-rate portfolio is 15% of total GO debt, and the commonwealth actively manages this under formal debt policies. About \$1.6 billion, or 7% of state GO debt, consists of unhedged variable-rate bonds, with the remainder of the variable-rate debt's interest rates

synthetically fixed through interest rate swaps. Massachusetts has a multiyear asset liability management program that could increase its exposure to unhedged variable-rate debt. However, there are no major plans to significantly expand its unhedged portfolio in the near term. In the past several years, the overall portfolio of variable-rate debt has diversified, and put risk has fallen significantly, in our opinion. The commonwealth also has about \$868 million of direct placement debt in six bond issues, whose structure we do not believe creates an unusual risk to the state. Tax-backed debt per capita is high, in our view, at what we calculate as \$5,411 at fiscal year-end 2017 and 8.2% of personal income. We also calculate combined total tax-backed debt service to operating expenditures as high at 7.3% on a GAAP basis.

The current five-year CIP projects debt service to remain below the commonwealth's calculation of 8% of budgeted revenues through fiscal 2023. A state debt and capital affordability committee conducts an annual debt affordability study. The committee includes seven voting members and eight nonvoting members from the legislature and is charged with formally reviewing the CIP and providing an estimate of debt authorization for the year. The current five-year CIP for fiscal 2018 through 2022 calls for new bonding of \$2.3 billion, about level with that of recent years, as part of a total five-year capital budget of \$4.4 billion. Our debt calculation includes special tax bonds supported by statewide tax sources in the ratios we use to assess total tax-supported debt.

Massachusetts has gradually lowered its investment return assumption in recent years, which we view as positive, but which translates into declines in its combined funded ratio and increased funding needs. The commonwealth lowered its assumed actuarial rate of return to 8.00% from 8.25% in 2013, to 7.75% in 2015, and to 7.50% in 2016. In 2017, it held the assumed return constant at 7.5%. The commonwealth also attributes recent declines in its funded ratio to previous-year investment losses and optional transfer of Optional Retirement Program members into Massachusetts State Employee Retirement System, and the adoption of an employee retirement incentive program. The new assumed rate of return of 7.5% remains below the Pension Retirement Investment Trust's 9.8% five-year average return as of fiscal year-end 2017, but above the 5.1% 10-year average return.

The combined pension-funded ratio of the various state retirement systems' net pension liability was 59.5% funded on a GASB basis as of Jan. 1, 2017, up marginally from 57.3% in January 2016. The net pension liability was \$37.3 billion, or \$5,438 per capita and 8.3% of state personal income.

Using the commonwealth's actuarial methodology and actuarial asset smoothing methods (not GASB), the funded ratio for the combined state employees, teachers, and Boston teachers' pension funds stayed the same at 56.7% as of Jan. 1, 2017, compared to the year before, but down from its most recent high point of 71.1% in 2011. If Massachusetts continues to increase pension contributions by 8.9% per year, the commonwealth calculates under its actuarial assumptions that it would reach a combined funded ratio of 62.4% in 2022. Based on Massachusetts' actuarial methodology, the commonwealth's primary government combined unfunded pension liability was \$39.6 billion, as of Jan. 1, 2017, up from \$37.9 billion in 2016.

Massachusetts' current plan assumes 8.9% per year growth in commonwealth annual pension contributions to reach full amortization of the commonwealth's unfunded liability by fiscal 2036, four years ahead of Massachusetts' statutory requirement. However, from a funding standpoint, Massachusetts has continued to calculate its contribution by setting funding targets based on percentage increases to contributions rather than adjusting for increases necessary to keep

level amortization of the liability. This translates into a slightly more back-loaded amortization of the liability.

Furthermore, the commonwealth continues to establish its contribution levels on a three-year lagged budgetary basis, although actuarial valuations are conducted each year. This policy of only adjusting the pension contribution schedule every three years can cause Massachusetts to fall below full ADC funding when actuarial assumptions miss actual experience, such as missed investment returns, or actuarial assumptions themselves have been changed, such as the recent lowering of assumed rates of return. While, a three-year lag in resetting pension contributions could provide a more predictable funding schedule for the commonwealth, we believe it also exposes Massachusetts to the risk of never catching up to full ADC funding if its actuarial assumptions prove too aggressive. The commonwealth has not contributed its full annual ADC since 2011, and we do not anticipate that it will do so in 2019.

In its most recent three-year funding schedule reset, Massachusetts updated its planned pension contributions to annual increases of 8.9% per year, up from its previously planned 7.0% annual increases. Despite these increased contributions, the funded ratio on an actuarial basis remains at 57%. In fiscal 2018, the commonwealth projects it will contribute 73% of ARC to its two main employees' retirement system, up from 72% in 2017, but down from 81% in fiscal 2014. For fiscal 2018, it has budgeted to fund \$2.39 billion, or 73%, of the \$3.29 billion ARC. As part of our revised criteria, we look to the ratio of active-to-inactive members to determine how mature the system is and how it compares with the national average. For Massachusetts State Retirement Board and Massachusetts Teachers' Retirement System, the ratio of actives to retirees is 1.45 and 1.42, respectively, and nearly in line with the 1.50 national average. Experience studies are only conducted every six years as per statute, which we view as a weakness. Although the commonwealth updates portions of the studies more frequently, this is not done on a set schedule, but rather as needed.

As of Jan. 1, 2017, Massachusetts had a \$19.4 billion unfunded actuarial accrued OPEB liability, which we consider sizable, at \$2,834 per capita, but stabilized at near the same level as five years ago because various reform measures have been phased in and the commonwealth has made OPEB trust fund deposits. Massachusetts has dedicated a portion of tobacco settlement revenues toward its OPEB trust fund to provide a permanent funding source, which we consider a credit positive, although exact deposits have deviated from formula depending on the enacted budget. The portion of tobacco settlement money dedicated to the OPEB trust fund was scheduled to increase in 10% increments each year, until it reaches 100%, although the incremental increase in contributions has been suspended since 2016. The commonwealth has budgeted a \$25 million deposit in fiscal 2018, or about 10% of tobacco settlement money. The trust had assets of \$817.4 million as of Jan. 1, 2017.

On a scale from '1.0' (strongest) to '4.0' (weakest), S&P Global Ratings assigned a score of '3.5' to Massachusetts' debt and liability profile.

Ratings Detail (As Of April 9, 2018)

Massachusetts Bay Transp Auth sr sales tax		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts Bay Transp Auth sr sales tax (AGM) (MBIA)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed

Ratings Detail (As Of April 9, 2018) (cont.)		
Massachusetts Bay Transp Auth subord Sales Tax <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts Bay Transp Auth subord Sales Tax <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts Bay Transp Auth subord Sales Tax <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts Bay Transp Auth CP <i>Short Term Rating</i>	A-1+	Affirmed
Massachusetts Bay Transp Auth CP <i>Short Term Rating</i>	A-1+	Affirmed
Massachusetts Bay Transp Auth CP <i>Short Term Rating</i>	A-1+	Affirmed
Massachusetts Bay Transp Auth SALESTAX <i>Long Term Rating</i>	AA/A-1+/Stable	Affirmed
Massachusetts Bay Transp Auth (PTC Project RRIF Loan) subord sales tax <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts Bay Transp Auth (PTC Project TIFIA Loan) subord sales tax <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts CP <i>Short Term Rating</i>	A-1+	Affirmed
Massachusetts CP A <i>Short Term Rating</i>	A-1+	Affirmed
Massachusetts CP B <i>Short Term Rating</i>	A-1+	Affirmed
Massachusetts GO <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO <i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO VRDBs - C <i>Long Term Rating</i>	AA/A-1/Stable	Affirmed
Massachusetts GO VRDBs 2000A <i>Long Term Rating</i>	AA/A-1/Stable	Affirmed
Massachusetts GO VRDBs 2000B <i>Long Term Rating</i>	AA/A-1/Stable	Affirmed
Massachusetts GO (wrap of insured) (ASSURED GTY & AMBAC) (SEC MKT) <i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (wrap of insured) (FGIC & BHAC) (SEC MKT) <i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed

Ratings Detail (As Of April 9, 2018) (cont.)		
Massachusetts GO (AGM) (SEC MKT)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (BAM) (SECMKT)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (BAM) (SECMKT)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (BAM) (SECMKT)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (BAM) (SEC MKT)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (FGIC)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO (MBIA) (Assured Gty)		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts GO		
<i>Long Term Rating</i>	AA/Stable	Affirmed
Massachusetts Bay Transp Auth sr sales tax		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
Massachusetts GO		
<i>Unenhanced Rating</i>	AA(SPUR)/Stable	Affirmed
The Commonwealth Of Massachusetts General Obligation Bonds Consolidated Loan of 2006 Series A		
<i>Long Term Rating</i>	AA/A-1/Stable	Affirmed
Boston Hsg Auth, Massachusetts		
Massachusetts		
Boston Hsg Auth (Massachusetts) APPROP		
<i>Long Term Rating</i>	A/Stable	Affirmed

Ratings Detail (As Of April 9, 2018) (cont.)

Massachusetts Bay Transp Auth, Massachusetts

Massachusetts

Massachusetts Bay Transp Auth (Massachusetts) GOEQUIV

Long Term Rating AA/Stable Affirmed

Massachusetts Bay Transp Auth (Massachusetts) GOEQUIV

Long Term Rating AA/A-1/Stable Affirmed

Massachusetts Bay Transp Auth (Massachusetts) GOEQUIV RMKTD

Long Term Rating AA/A-1/Stable Affirmed

Massachusetts Bay Transp Auth (Massachusetts) GOEQUIV (AGM)

Unenhanced Rating AA(SPUR)/Stable Affirmed

Massachusetts Bay Transp Auth transp sys bnds (Massachusetts)

Unenhanced Rating AA(SPUR)/Stable Affirmed

Massachusetts Bay Transp Auth (Massachusetts)

Unenhanced Rating AA(SPUR)/Stable Affirmed

Massachusetts Dept of Transp, Massachusetts

Massachusetts

Massachusetts Dept of Transp (Massachusetts) GO

Long Term Rating AA/Stable Affirmed

Massachusetts Dept of Transp (Massachusetts) GO

Long Term Rating AA/Stable Affirmed

Massachusetts Dept of Transp (Massachusetts) GO

Long Term Rating AA/Stable Affirmed

Massachusetts Dept of Transp (Massachusetts) GO VRDO

Long Term Rating AA/A-1+/Stable Affirmed

Massachusetts Dept of Transp (Massachusetts) GO VRDO

Long Term Rating AA/A-1/Stable Affirmed

Unenhanced Rating NR(SPUR)

Massachusetts Dept of Transp (Massachusetts) GO VRDO

Long Term Rating AA/A-1+/Stable Affirmed

Massachusetts Dept of Transp (Massachusetts) JOINTCRIT

Long Term Rating AA+/A-1 Affirmed

Unenhanced Rating AA(SPUR)/Stable Affirmed

Massachusetts Dept of Transp (Massachusetts) JOINTCRIT

Long Term Rating AA+/A-1 Affirmed

Unenhanced Rating AA(SPUR)/Stable Affirmed

Massachusetts Development Finance Agency, Massachusetts

Massachusetts

Massachusetts Dev Fin Agy (Massachusetts) GO

Long Term Rating AA/Stable Affirmed

Univ of Massachusetts Bldg Auth, Massachusetts

Massachusetts

University of Massachusetts Bldg Auth (Massachusetts) GOEQUIV

Ratings Detail (As Of April 9, 2018) (cont.)

<i>Long Term Rating</i>	AA/A-1/Stable	Affirmed
Univ of Massachusetts Bldg Auth (Massachusetts) GOEQUIV		
<i>Long Term Rating</i>	AA/A-1+/Stable	Affirmed
Many issues are enhanced by bond insurance.		

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